Living Shorelines

a natural solution

Shoreline Restoration, Indian River Marina

Background

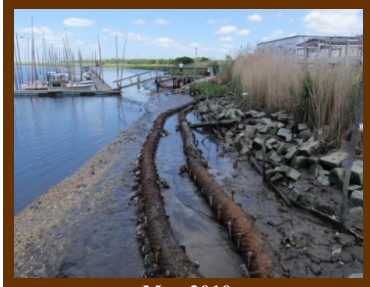
A "Living Shoreline" is a method of bank stabilization that reinforces the shoreline to protect coastal properties from erosion, while also restoring and enhancing fish and wildlife habitat. Unlike bulkheads and revetments, Living Shorelines use natural materials to maintain existing connections between the shoreline and aquatic areas. A number of Living Shoreline materials and tactics are available, including coconut fiber logs, recycled shell, and native wetland vegetation. Living Shorelines have been built throughout coastal regions and are a popular option for bank stabilization because they protect property from erosion while attracting fish and shellfish, filtering stormwater, and absorbing wave energy during storms.

Indian River Marina Approach

Two uniquely different shorelines were restored at the Indian River Marina in Rehoboth Beach, DE. The "marsh" restoration site was constructed to address an undercut and deteriorating existing salt marsh shoreline. The "rip-rap" restoration site was built along a sandy shoreline as an option for "greening-up" an existing rip-rap structure. Both sites are exposed to low wave energy, so standard vegetated living shoreline tactics were selected. Shorelines subject to high wave energy may require marsh sills or offshore breakwaters but should only be used when necessary.

Coconut fiber matting and logs were positioned in the intertidal zone before being staked down and tied in place. Oyster shell bags were then arranged in front of the coir logs to further armor the shoreline and absorb wave energy. Following installation, clean sand fill was brought to the restoration sites and graded to the desired elevation and slope before planting with Smooth Cordgrass (*Spartina alterniflora*).

Completed Shoreline project at the Heislerville Fish & Wildlife Management Area's Marina in New Jersey



May 2010
Coir materials installed, but prior to planting

June 2011
One year later plants established

Permitting

Authorization under the Statewide Activity Approval (SAA) for Shoreline Stabilization Projects is available for Living Shorelines in Delaware. For projects under 500 linear feet using native marsh vegetation this expedited permitting process costs half the price and is issued sooner than standard permits. A federal permit is also required, with the Indian River Marina projects meeting the requirements to be permitted using Army Corps Nationwide Permit No. 27 for "Aquatic Habitat Restoration". Permitting information can be found at: http://de.gov/wetlandpermits.

More Information

Delaware Department of Natural Resources and Environmental Control
Division of Watershed Stewardship
302-739-9939
http://de.gov/delawarewetlands

Partnership for the Delaware Estuary
302-655-4990
http://www.delawareestuary.org/

Delaware Center for the Inland Bays
302-226-8105
www.inlandbays.org

http://www.delawareestuary.org/living-shorelines

Status and Next Steps

Both Living Shoreline projects were installed on April 14-17, 2014. While many shorelines will naturally collect sediment, after 2 months of monitoring this area approximately 45 yd^3 of clean sand was used to grade the shorelines to the optimal growing elevation for Smooth Cordgrass. Sites will be planted in March 2015 with Smooth Cordgrass. Spring planting will allow vegetation to take root throughout the growing season before winter storms.

Living Shorelines may need slight augmentation over the years. However, successful projects throughout the Mid-Atlantic have survived multiple hurricanes!

Costs

Below is a comprehensive list of materials used for each of the Living Shoreline sites at the Indian River Marina and their associated costs. Like all shoreline restoration projects, costs can vary greatly depending on the extent of the project, whether sand fill is needed, and if additional structures are installed for higher energy sites.

Cost-Share Program: To aid landowners installing Living Shorelines on their property, the Sussex Conservation District and DNREC provide cost-share assistance for many living shoreline projects. Cost-share is paid at 50% of the actual project cost, up to $5,000 for projects anywhere in DE. For additional information: http://www.sussexconservation.org/programs/cost-share-program.

Rip-Rap Site (closest to loading dock, 84 linear ft)

ITEM	PRICE	NOTES	IR Rip-rap	IR Rip-rap	per ft
Coir Logs	$127.89	12' x 16" log	12 logs	$1,534.68	$18.27
Coir Mat	$201.60	165 linear ft	1 roll	$201.60	$2.40
Twine	$40.00	1 roll	1 roll	$40.00	$0.48
Spartina plugs	$0.50	1 per sq ft	867 plugs	$433.50	$5.16
4' stakes	$1.95	12 per log	144 stakes	$280.80	$3.34
Oyster shell	$5.00	per linear ft	84ft	$420.00	$5.00
Sand	varies		$500	$500	$5.95
			TOTAL=	$3,410.58	$40.60

Marsh Site (closest to causeway, 48 linear ft)

ITEM	PRICE	NOTES	IR Marsh	IR Marsh	per ft
Coir Logs	$127.89	12' x 16" log	7 logs	$895.23	$18.65
Coir Mat	$201.60	165 linear ft	1 roll	$201.60	$4.20
Twine	$40.00	1 roll	1 roll	$40.00	$0.83
Spartina plugs	$0.50	1 per sq ft	366 plugs	$183.00	$3.81
4' stakes	$1.95	12 per log	84 stakes	$163.80	$3.41
Oyster shell	$5.00	per linear ft	48 ft	$240.00	$5.00
Sand	varies		$300	$300	$6.25
			TOTAL=	$2,023.63	$42.16